Reference for setting up (X)Net for IP node links in Linux, including Raspberrys.

This is for reference only; it doesn't describe the specific configurations. It starts with a couple basic things you need to install to get IP links working. If you're using (X)net for RF-only or linking to BPQ running on your same system, nothing in this document is necessary. The document for installing (X)Net and configuring it as RF-only and/or linking to BPQ is here: https://www.qsl.net/swlkp3/Packet/(X)Net/xnet_Install.doc

In this document, I list the steps I use to start various scripts needed and (X)net itself. For reference I included the text of the scripts themselves, the text of my configuration files, and the output of my network configuration after running *ifconfig*. It's assumed that you already have NET44 addresses, and that (X)Net is already installed. Thanks to Bob Tenty VE3TOK for all his help.

First, install the following:

```
sudo apt install ampr-ripd
sudo apt install socat
```

Next, create and configure the start-slip file and make it executable. Configure the IP.NET, AUTOEXEC.NET, and AUTOBOOT.NET files according to your particular setup. All these files including start-slip should be in your /linuxnet/ folder. See the config files below for reference.

Then run in the order below (start Direwolf and/or BPQ first, if you are using them in your node system):

1. Open a terminal and run the following :

```
sudo socat -d -d -ly pty,raw,echo=0,link=/dev/xnet10 pty,raw,echo=0,link=/dev/xnet11
```

2. In another terminal, CD into the 'linuxnet' folder and run:

```
sudo ./start-slip
```

3. Wait for slip to initialize, then run:

```
sudo /.linuxnet
```

For reference:
----

* An IP address ***must*** be set for the Linux kernel and another one for (X)Net, for SLIP links.
* I have two AXUDP links, one to N2KGC-1, and one to VE3CLG-8.

My kernel address: 44.68.161.2
My (X)Net address: 44.68.161.1
My Linux computer's IP address: 192.168.1.43
My AMPR subnet: 44.68.161.0/28

Contents of my IP.NET file:

```
-------------------------------------
#IP Address
myip 44.68.161.1
subnet 44.68.161.0/28
#
#ARP to slip link
arp add 44.68.161.1 SLIP sdev0
arp add 44.68.220.1 AX25 n2kgc-1
#
#Default route
ipr add default slip 44.68.161.1
ipr add 44.68.161.0/28 slip 44.68.161.1 #local host
#
#Name Server
namesrv 192.168.1.43
```

Contents of my AUTOBOOT.NET file:

```
--------------------------------------------------
attach sdev0 slip 38400 /dev/xnet11
attach sdev1 kiss 2 1 19200 /dev/ttyp1  #virtual COM1 port for Direwolf 1200bd VHF
attach sdev2 kiss 3 1 19200 /dev/ttyp2 #virtual COM2 port for Direwolf 1200bd UHF
attach ip3 axUDP 4 1 44.135.82.17  #VE3CLG-8
attach ip4 axUDP 5 1 d10093 l10094 127.0.0.1  #KP3FT-2 BPQ
attach ip5 axUDP 6 1 44.68.220.2 #N2KGC-1 Flexnet
#2m RF backbone
po 2 baud 1200
#po 2 acon 1
po 2 dup 0
po 2 win 4
po 2 quality 203
po 2 name VHF userport
#route bc add 2 nc2c-1
#route bc add 2 nc2c-1 NODES
route fl add 2 nc2c-1
#70cm RF backbone port
po 3 baud 1200
#po 3 acon 1
po 3 dup 0
po 3 win 4
po 3 name UHF userport
#
#Link to VE3CLG-8
po 4 baud 38400
po 4 dup 0
po 4 win 7
po 4 name VE3CLG-8
po 4 qual 203
route bc ad 4 ve3clg-8
route fl add 4 ve3clg-8
#Link to KP3FT-2 BPQ node
```

```
po 5 dup 0
po 5 baud 115200
po 5 win 7
po 5 name KP3FT-2 BPQ
po 5 qual 203
route bc add 5 kp3ft-2
route bc add 5 NODES
#Link to N2KGC-1 Flexnet node
po 6 baud 38400
po 6 dup 0
po 6 win 7
po 6 name N2KGC-1 Flexnet
po 6 qual 203
route bc add 6 n2kgc-1
route fl add 6 n2kgc-1
route bc add 6 NODES
```

Contents of my AUTOEXEC.NET file:

```
start routed
start telnetd
start tcpd
start ip
start httpd
start beacond
BEACON A 1800 2 ID text CHENGO:KP3FT-1 (X)Net node in South New Berlin, NY, an Eastnet Packet Network node.
my call KP3FT-1
my alias CHENGO
my tcall KP3FT-8
```

Contents of my ‘start-slip’ file located in /home/prdogs/linuxnet/ folder:

```
#!/bin/sh
#--------------------------------------------
# Setup sl0 for XNet / Linux
# 25-Mar-2000  HB9PAE@HB9OS
#--------------------------------------------
#XNET_DIR=/home/kp3ft/linuxnet
#LINIP=192.168.1.43 #LINUX-IP   address
#XNETAMPR=44.68.161.1  # XNET-Ampr  address
#
echo "Initiating SLIP connection to XNET/Linux..."
slattach -s 38400 -p slip /dev/xnet10 &
sleep 3
/sbin/ifconfig tunl0 44.68.161.2  txqueuelen 1000 up
sleep 5
/sbin/ip route del 44.0.0.0/8
sleep 5
/usr/sbin/ampr-ripd -s -r -i tunl0 -L kp3ft@fn22hm
sleep 5
/sbin/ifconfig tunl0 mtu 1460
ifconfig sl0 44.68.161.2 netmask 255.255.255.255 pointopoint 44.68.161.1 mtu 236 up
```

```
sleep 1
#set route to hamnet
ip route add 44.68.161.1 dev sl0
# eof
```

The output after running ifconfig:

```
prdogs@prdogs-Latitude-2100:~$ ifconfig

enp9s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether b8:ac:6f:6f:19:d8  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 19

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 618244  bytes 104800433 (104.8 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 618244  bytes 104800433 (104.8 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

sl0: flags=4305<UP,POINTOPOINT,RUNNING,NOARP,MULTICAST>  mtu 236
        inet 44.68.161.2  netmask 255.255.255.255  destination 44.68.161.1
        slip  txqueuelen 10  (Serial Line IP)
        RX packets 57319  bytes 3268490 (3.2 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 109126  bytes 15991653 (15.9 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

tunl0: flags=4289<UP,RUNNING,NOARP,MULTICAST>  mtu 1460
        inet 44.68.161.2  netmask 255.0.0.0
        tunnel   txqueuelen 1000  (IPIP Tunnel)
        RX packets 2708688  bytes 551301757 (551.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1239568  bytes 135366096 (135.3 MB)
        TX errors 72  dropped 0 overruns 0  carrier 72  collisions 0

wlp12s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.43  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::f650:4b81:dc40:e0f4  prefixlen 64  scopeid 0x20<link>
        ether 78:e4:00:ab:db:3c  txqueuelen 1000  (Ethernet)
        RX packets 25059597  bytes 3283055793 (3.2 GB)
        RX errors 0  dropped 0  overruns 0  frame 4831017
        TX packets 23136635  bytes 2166238258 (2.1 GB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
device interrupt 17  base 0xc000
```